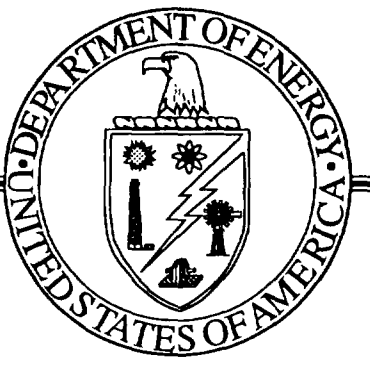
INITIAL SITE RESPONSE PLAN

IDAHO
NATIONAL ENGINEERING LABORATORY



IDAHO NATIONAL ENGINEERING LABORATORY
MANAGEMENT RESPONSE PLAN
FOR THE
CHEMICAL SAFETY VULNERABILITY FIELD ASSESSMENT

Introduction

This report presents the response to the field verification report for the Chemical Safety Vulnerability Review of the Idaho National Engineering Laboratory (INEL). The review occurred from May 2 to May 10, 1994. The INEL was one of nine sites visited as part of the Chemical Vulnerability Review being conducted by the DOE's Office of Environment, Safety and Health at the direction of the Secretary of Energy. The purpose of the DOE complex-wide review is to identify and characterize site-specific and complex-wide vulnerability involving potentially hazardous chemicals at DOE facilities.

Response Summary

Ongoing activities at the INEL include the varied use, handling, transportation, retention, and disposal of hazardous chemicals primarily related to storage, conditioning for final disposition, and processing of spent fuel and other radioactive materials; reactor research and development functions; environmental restoration and waste management; maintenance functions; and analytical laboratory activities. During the field verification review, team members reviewed those facilities included in the INEL self-evaluation effort, i.e., CPP-601/602/621 Fuel Processing Facility; Idaho Chemical Processing Plant (ICPP) Tank Farm; Pad A at the Radioactive Waste Management Complex; Pit 9 at the Radioactive Waste Management Complex; Army Reentry Vehicle Facility Site (ARVFS) Sodium-Potassium Waste Storage Unit; Power Burst Facility Reactor Area Evaporation Pond; and Argonne National Laboratory-West (ANL-W) Analytical Laboratory. In addition, the Fluorinel Dissolution Process and Fuel Storage (FAST) Facility, the Waste Calcining Facility, and the Rover Headend Processing Plant at the ICPP; the Radioactive Sodium Storage Facility and Radioactive Scrap and Waste Facility at ANL-W; and selected emergency response facilities were examined by the review team.

Three vulnerabilities were identified as a result of the INEL field verification review. They are:

1. Spills and releases to the soil from past operations that pose a hazard to workers involved in future activities that may disturb soils at the site (e.g., from construction or decontamination and decommissioning).

2. Hazardous chemicals and wastes that have been stored onsite for excessive periods without a clear disposition plan.

3. Weaknesses in emergency management program documentation that would impact the effectiveness of responses to hazardous material releases.

The team noted that none of the identified vulnerabilities represent a condition or circumstance with the potential for severe near-term consequences.

The noteworthy practices identified at the INEL include:

- The establishment of a sitewide chemical exchange system for excess chemicals.

- Successful efforts at the ICPP to eliminate inventory of bulk hazardous chemicals at facilities in transition.

- The planning, execution, and documentation for the flushing of chemical storage and processing systems at the FAST Facility and the Fuel Processing Facility at the ICPP.

- Maintenance and work control related to chemical systems at the ICPP.

- The replacement of aging safety systems at the ANL-W Analytical Laboratory.

- Use of the Waste Management Authority (committee) at the ICPP to review waste implications prior to changes in process or chemical use or purchase.

- A model chemical hygiene program for laboratory operations at the ANL-W Analytical Laboratory.

- The use of the Idaho Training Advisory Council to facilitate information exchange and improve consistency of chemical safety-related training across site contractors.

- The development of nomograph for use in planning response to chemical incidents at the ICPP.

This document constitutes the initial response to the INEL site visit. The form of the response is in two parts. Part 1 reviews the five functional areas of the review. Actions to resolve the INEL vulnerability are provided. Part 2 provides additional information on the nine noteworthy practices identified in the review. The sharing of these noteworthy practices with other sites to improve chemical safety at other sites is encouraged, and points-of-contact have been identified.

During the period of time that the INEL chemical safety self-assessment and field verification reviews were conducted, several Management and Operations contractors were responsible for activities at the INEL. Specific facilities for which self-assessments and reviews were performed in conjunction with this chemical safety vulnerability study were primarily associated with Westinghouse Idaho Nuclear Company (WINCO) and EG&G, Idaho. The INEL contract has since been rebid, and Lockheed Idaho Technologies Company (LITCO) has been awarded the consolidated contract. LITCO is projected to take over the contract October 1, 1994. Resources will continue to be available to prevent, mitigate, and correct potential chemical safety vulnerabilities at the INEL.

CHEMICAL SAFETY VULNERABILITY REVIEW
Part I
September 1994

Site/Facility: Idaho National Engineering Laboratory **Vulnerability Number: CSVR-INEL-CH-01**
Functional Area: Identification of Chemical Holdings
Point of Contact: G. T. Paulson

Vulnerability:

- Contamination of soil by discharges of large quantities of hazardous material.

Summary of Vulnerability:

- Four hundred spills, leaks, and discharges of hazardous materials to the soil have been identified for the INEL, with 83 of these being at the ICPP. Spills of hazardous materials have occurred from process lines and from bulk storage areas at the ICPP. In the past, there have also been intentional discharges of hazardous materials to soils. Known releases have occurred from pipes in the vent tunnel at CPP-601, from bulk chemical storage facilities at CPP-621, and leaks of high-level waste and dichromate at the tank farm. Other releases to soil have occurred through discharge of cleaning agents to French drains, tank overflows, punctured drums, and discarded paints and paint solvents.

  These leaks, spills, and discharges create the potential for future exposure to workers and release to the environment during construction, decontamination and decommissioning, and other activities that disturb the soil. WINCO has taken several important steps to mitigate those hazards. Efforts have been made to identify, investigate, and, in some cases, remediate historical leak sites, and procedures are in place specifying required actions in the event that additional spill locations are discovered. Known locations have been designated as Environmentally Controlled Areas (ECA) that are posted to protect the health and safety of workers. This vulnerability was prioritized as one which could result in short-term consequences of low-potential severity.

Response:

1. After the completion of the consolidation of current INEL operating contractors, the INEL program for dealing with chemical contamination of soil will be reviewed by December 1994. The INEL program contains the following elements:

   - Continue to use Federal Facilities Agreement and Consent Order process to identify and control new sites.
   - Control disturbances at identified sites.
   - Control exposures during remediation activities through work and process controls.
   - Continue to obtain approval from regulators on disposition of release sites.

CHEMICAL SAFETY VULNERABILITY REVIEW
Part I
September 1994

Site/Facility: Idaho National Engineering Laboratory **Vulnerability Number: CSVR-INEL-CH-02**
Functional Area: Identification of Chemical Holdings
Point of Contact: G. T. Paulson

Vulnerability:

- Delays in disposition of hazardous materials and waste.

Summary of Vulnerability:

- For some facilities, the INEL has made substantial progress in arranging for final disposition of unneeded hazardous chemicals and improperly stored hazardous wastes. However, several examples of planning and arrangement for final disposition have not been provided. Approximately 10,000 gallons of cooling water containing dichromate are stored in two tanks, without secondary containment, in the ICPP tank farm area. The cooling system has not been used since 1988 and will not be needed again for at least 5 to 10 years.

  In addition, approximately 1,000 gallons of reclaimed hexone solvent extractant are being held in cell tankage in CPP-601. The material is contaminated with fission products. The ARVFS bunker managed by EG&G Idaho contains four containers of NaK mixed waste that have been stored there since 1974. The bunker is an interim status storage facility, and the containers were last inspected in 1979. The condition of the containers is unknown. Treatment options are currently being considered for both of the latter examples; however, each represents a continuing risk to workers and environment that could be limited by their removal for treatment or disposal. This vulnerability was prioritized as one that could result in medium-term consequences of medium potential severity.

Response:

1. Issue a revised action plan for the ICPP cooling water by December 1994.

2. Update the present action plan for the ICPP hexane by December 1994 to reflect the change in disposition strategy for the material from incineration at WERF (unavailable) to transport to commercial incineration in Tennessee at the point where the hexane is considered a waste (anticipated 3Q FY 95).

3. Issue a revised action plan for the ARVFS NaK by December 1994.

4. Evaluate the need to develop INEL-wide policy requiring evaluation of chemicals after a specified period of non-use to determine if they should be retained or disposed of or replaced with an alternative by March 1995.

CHEMICAL SAFETY VULNERABILITY REVIEW
Part I
September 1994

Site/Facility: Idaho National Engineering Laboratory **Vulnerability Number: CSVR-INEL-EMP-01**
Functional Area: Emergency Management Programs
Point of Contact: G. T. Paulson

Vulnerability:

- Weaknesses in the INEL emergency management programs documentation.

Summary of Vulnerability:

- Emergency Management Programs - The DOE review included the Emergency Response Plan, in-plant consequences, environmental issues, coordination with the community, and community right-to-know issues.

  The Idaho National Engineering Laboratory/West Valley Demonstration Project Emergency Plan 1993 was developed to assure consistent and controlled emergency response actions for any operational emergency, including those associated with chemical incidents. However, this umbrella plan is not supported by Emergency Plan Implementing Procedures (EPIPs) and does not include Emergency Action Levels (EALs). In addition, EALs for hazardous chemical events are inconsistent among INEL contractors and within the INEL Emergency Plan. Some hazardous material EALS are inconsistent between a contractor's plan and their own EPIPs.

  The EPIPs and EALs play a fundamental role in assuring proper response to a chemical emergency. EALs are the specific indicators used to determine occurrence category and emergency class. The category of emergency (based on severity) drives the level of activation, the level of initial resources, and protective measures taken onsite or offsite. If the level of initial response is incorrect, an incident could escalate. This vulnerability was prioritized as one that could result in immediate-term consequences of medium potential severity.

  The consistency issue will be resolved by the INEL reorganization and reassignment of organizations reporting to the DOE Idaho Operations Office.

Response:

1. Issue an action plan for improving emergency preparedness for chemical emergencies by December 1994.

CHEMICAL SAFETY VULNERABILITY REVIEW
Part I
September 1994

Site/Facility: Idaho National Engineering Laboratory **Noteworthy Practices**
Point of Contact: G. T. Paulson

1. Identification of Chemical Holdings - Noteworthy practices identified in this area are:

   - The establishment of a sitewide chemical exchange system for excess chemicals.
   - Successful efforts at the ICPP to eliminate inventory of bulk hazardous chemicals at facilities in transition.
   - The planning, execution, and documentation for the flushing of chemical storage and processing systems at the FAST Facility and the Fuel Processing Facility.

2. Emergency Management Programs - The DOE review included the Emergency Response Plan, in-plant consequences, environmental issues, coordination with the community, and community right-to-know issues.

3. Facility Physical Condition - The DOE review included engineered barriers, maintenance conditions, chemical systems, safety systems, storage, monitoring systems, and hazards identification. No vulnerabilities were identified in this area. One noteworthy practice was identified as the replacement of aging safety systems at the ANL-W Analytical Laboratory. It is recommended that this activity be viewed in a broader complex-wide perspective.

4. Operational Control and Management Systems - The DOE review included organizational structure; requirements identification; hazard analysis; procedural adherence; maintenance control; engineering and design reviews; configuration control; safe shutdown plans; and site programs for quality assurance, chemical safety, inventory control, access control, disposal, transportation and packaging, and corrective actions.

   Noteworthy practices identified in this area are:

   - Maintenance and work control related to chemical systems at the ICPP.
   - Use of the Waste Management Authority (committee) at the ICPP to review waste implications prior to changes in process or chemical use/purchase.
   - A model chemical hygiene program for laboratory operations at the ANL-W Analytical Laboratory.

   It is recommended that these practices be considered in applications elsewhere in the DOE complex.

5. Human Resource Programs - The DOE review included technical competence, staffing, training and qualifications, employee involvement, employee concerns, personnel performance requirements, and visitor and subcontractor control. No vulnerabilities were identified. One noteworthy practice was identified in this area. It was the use of the Idaho Training Advisory Council to facilitate information exchange and improve consistency of chemical safety-related training across site contractors. It is recommended that this practice be considered in applications elsewhere in the DOE complex for large sites.

Part 2 - Noteworthy Practices

1. Sitewide chemical exchange system for excess chemicals.

In response to *DOE-ID 10333 1992 rev.1, United States Department of Energy Idaho Field Office Waste Minimization and Pollution Prevention Awareness Plan*, the Material Exchange Program (MEP) was established at the INEL. The MEP promotes the transfer of excess or unneeded material among the organizations at the INEL. Its primary goal is to reduce waste, but the safety benefit of reducing unused chemical inventories is significant.

The MEP applies to unused material, such as laboratory chemicals, janitorial chemicals, decontamination chemicals, containerized gases, paints, oils, adhesives, and other similar materials. The MEP does not apply to radioactive or radioactively contaminated material (except radiological calibration sources), designated hazardous waste material, or any property or material inventories controlled by EG&G Idaho Property Control.

Material users identify excess unused material and report its availability to the Material Exchange Coordinators. The coordinators pass this information on to the Material Exchange Manager. The manager is responsible to administer and implement the program. The manager evaluates excess material and identifies concerns related to the material. The information is entered into a database, and the material is tracked until it is transferred or disposed.

Available material is advertised in *INEL PREVENT*, Office Vision, and the *Federal Exchange*. *INEL PREVENT* is published quarterly and lists excess material available to INEL organizations. Office Vision is an internal electronic information source. If the material users are unable to find an acceptor in a reasonable time period, the material is placed on the *Federal Exchange*.

The safety benefit of reducing unneeded chemical inventories is significant. The storage and disposal of unneeded material is also expensive. This program could be transferred to any facility.

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2. **Elimination of bulk hazardous chemical inventories at the ICPP transition facilities.**

In April of 1992, the DOE directed the ICPP to stop reprocessing spent nuclear fuel. As a result, bulk hazardous chemicals associated with the process were no longer needed. The chemicals included cadmium nitrate, cadmium sulfate, hydrofluoric acid, and fluoboric acid. If these chemicals had been treated as waste, the liability for WINCO and the DOE would have been significant.

In order to avoid treating the chemicals as waste, WINCO chose to sell the chemicals to outside buyers. Selling the chemicals will remove all waste disposal liability. The process is incomplete, but contracts are in place for the transfer of the chemicals.

In an era of change within the DOE complex, many facilities will undergo mission transition. As a result, chemicals associated with previous activities will require disposal. The practice of seeking a buyer is an alternative available to all contractors in the DOE complex.

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3. **Planning, execution, and documentation for the flushing of chemical storage and processing facilities at FAST and the Fuel Processing Facility.**

In April of 1992, the DOE directed the ICPP to stop reprocessing spent nuclear fuel. As a result, the reprocessing facilities required phase-out and cleanup. Due to the presence of cadmium in the systems, the processing facilities contained mixed waste (hazardous and radioactive).

Since mixed waste presents a difficult disposal problem, removing the hazardous constituent (cadmium) was viewed as a best management practice. This would allow the waste to be treated as merely radiological, and the disposal would be much easier.

Once the project was completed, the sample results indicated that cadmium was reduced to nondetectable levels. Since disposing of mixed waste is an ongoing problem, the practice of removing hazardous constituents should be common practice in the DOE complex.

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4. **Maintenance work control at the ICPP.**

Work Control Core Teams are an innovative change in the way maintenance work is performed in hazardous and environmentally sensitive areas at the ICPP. They are designed to ensure the availability of subject matter experts in the development of maintenance work packages. The teams include members from divergent professional disciplines in order to ensure the work is performed safely with the highest quality standards. This new way of conducting business was developed by WINCO personnel.

Core teams consist of a facility point-of-contact, systems engineer, maintenance foreman, scheduler, flow integrator, and administrative assistant. They also include representatives from quality assurance, environmental compliance, industrial safety, and radiological safety. Personnel assigned to core teams have sufficient experience, training, and authority to review, approve, prioritize, and schedule work requests. Each team is trained and dedicated to a specific process area within the facility. Since the teams are located in the facilities they serve, they are able to develop a sense of ownership, understand inherent facility concerns, and develop a knowledge base for sound decision making.

Customer satisfaction, employee safety, environmental protection, and equipment reliability are the daily concerns of each team. Core teams have reduced the safety work order backlog by 25 percent. Since the teams evaluate work orders during the development process, the quality of the work orders has improved significantly. The reduction in the safety work order backlog and the improved quality of work orders have helped to produce over 2,000,000 perfect work hours at the ICPP.

WINCO's use of dedicated subject matter experts to develop, review, approve, prioritize, and schedule work packages is a unique and innovative practice within the DOE complex. Although the focus of this review was chemical safety, the core team program improves all aspects of safety, product quality, and work order turnaround.

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5. **Replacement of aging safety systems at the ANL-W Analytical Laboratory.**

The Analytical Laboratory at ANL-W performs chemical analysis for both radioactive and nonradioactive materials in support of ANL-W programs and facilities. Activities are accomplished in dedicated gloveboxes, hot cells, and in the general laboratory working area.

Due to evolving missions at ANL-W, the Analytical Laboratory facilities required upgrading. A risk analysis was performed, and a graded approach to system upgrades was established. ANL-W is currently refurbishing and modifying the 30-year old hot cells as well as aging critical and safety-related systems in Building 752. Upgrades include modifications to electrical power distribution; replacement of deteriorated waste, vacuum, air, water, steam, and suspect liquid waste lines; and installation of double HEPA filtration for the hot cells.

ANL-W is collecting and characterizing all wastewater from sinks and the janitor closet in the Analytical Laboratory to determine the appropriate disposition. Support systems in need of replacement, excluding the hot cells, have been identified, prioritized, and scheduled for replacement as funding becomes available.

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6. **WINCO Waste Management Authority.**

In the spring of 1993, Westinghouse formalized its longstanding policy of prohibiting waste generation without sufficient preplanning and approval to ensure proper, subsequent handling of waste. In support of this policy and to improve the effective implementation of waste management concepts, WINCO initiated the Waste Management Authority (WMA) at the ICPP.

The purpose of the WMA is to identify, review, and approve/disapprove mixed, hazardous, radioactive, and industrial wastestreams prior to their generation. The program is designed to ensure that wastestreams are minimized and controlled, recycled or reused where possible; have identified storage and treatment; and are managed in compliance with regulations governing their generation, handling, storage, treatment and disposal/reclamation. The procedure implementing the WMA calls for generators to complete a waste-generation profile form indicating planned waste composition, minimization activities, potential recycling or secondary use, sampling requirements, storage, treatment, and disposal, as applicable, for review by the WMA before the process wastestream has begun. Information concerning proposed wastestreams is compared to existing, approved wastestreams in the database for waste minimization ideas, similarities with existing wastestreams to eliminate redundant waste analysis, and established wastestreams reported under national and site-specific databases.

The WMA is comprised of technical representatives from various organizations and disciplines at the ICPP, who review and approve/disapprove the proposed waste generation. The team is responsible for communicating lessons learned, treatment needs, minimization successes, and other relevant information to management. Positive impacts from implementation of this program are designed to ensure appropriate technology development and transfer; focus attention to urgent waste management requirements; reduce waste management costs through planning, improved reporting, waste minimization, and information sharing; and enhance communication among operations, waste management, and environmental personnel.

Establishing the WMA has resulted in a unique approach to managing waste consistent with WINCO's vision of environmental leadership. By sharing this idea with other facilities in the DOE complex, a new standard will be established that provides a consistent approach to environmental excellence.

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7. **Chemical Hygiene Program, Laboratory Operations, Analytical Laboratory, Argonne National Laboratory-West.**

ANL-W is committed to providing a safe work environment and believes employees have a right to know about health and physical hazards associated with their work. As a result, ANL-W has instituted a model chemical hygiene program for their Analytical Laboratory. The goal of the Analytical Chemical Hygiene Training is to instill in each employee an awareness of potentially hazardous chemicals in the workplace and to train employees in safe work practices.

The training reviews the requirements of the OSHA Laboratory Standard and describes how the requirements are implemented in the Analytical Laboratory. Chemical Hygiene Training is provided to all Analytical Laboratory personnel and to anyone desiring unescorted access to the laboratory. The training is performance based, and a closed-book exam, requiring at least an 80 percent score, is the tool used to measure performance.

The Analytical Laboratory Chemical Hygiene Training has served as a model for the development of two other programs at ANL-W. The training could be transferred to other DOE sites and customized to meet the requirements of other facilities.

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8. INEL Training Advisory Council.

The INEL Training Advisory Council was established to "coordinate and optimize selected contractor resources to address common training issues."[1] The Council's primary goal is to support and consolidate the development of common sitewide training. This includes such activities as requirements analysis, training design, issuance of training products, and standards evaluation. The Council also establishes standards for recordkeeping and investigates other training sources within the DOE complex.

The Council includes representatives from each of the INEL prime contractors. These representatives have the authority to make decisions and commit resources on behalf of the contractor. Standing and Ad Hoc committees are established at the discretion of the Council to address specific tasks.

The INEL Training Advisory Council provides numerous benefits. First, the availability of quality training materials is assured through shared resources. In the case of chemical safety, this is always the highest priority. Second, it provides consistent training for all INEL workers, regardless of facility location. Third, the cost savings are significant. The program could be easily implemented at other sites in the DOE complex.

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[1] *INEL Training Advisory Council Charter*, Revision 2. September 10, 1993.

9. **Development of a nomograph for use in planning response to chemical incidents at the ICPP.**

WINCO Emergency Management (EM) and Operational Safety Analysis (OSA) are developing operator aids for hazardous material accident assessments. These aids are expected to provide a cost-effective means for improving the accuracy and timeliness of consequence assessments for accidents occurring during backshift and weekend operations at the ICPP.

Personal computers programmed with accident assessment modeling codes were recently installed in the ICPP Emergency Control Center (ECC) as the primary means for estimating the consequences from accidents involving hazardous materials. However, personnel assigned to the technical support staff on backshifts may not have the same technical orientation as day shift personnel and may have difficulty in maintaining the necessary technical proficiency.

In response to this concern, OSA (technical lead) and EM are developing nomograph-type assessment aids. The aids are being designed to assist the ECC technical support staff in making initial accident consequence assessments on which initial protective action recommendations are based.

The vision for the project is twofold. First, the aids are intended to be used by any technically trained person (for example, shift supervisor, shift foreman, HP supervisor, etc.) to make a quick, conservative, estimate of the potential consequences from a spill of hazardous materials. Second, the assessor should be able to use the resource effectively with little or no previous training. As currently designed, the assessor determines the material spilled, spill area, windspeed, and observable weather conditions. A simple connect-the-dots approach produces a conservative estimate of the downwind distance where airborne concentrations could approach the limits at which protective actions would be required.

The use of the nomograph as an assessment tool could be used at other DOE facilities. It will allow personnel to make conservative judgments in an emergency situation. The principles could be applied to any area requiring evaluations with varying parameters.

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